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17. (Not amended herein) The elevator safety brake of claim 16, wherein the friction pad's coefficient of friction remains relatively constant during a single slide along the elevator guide rail.

18. (Not amended herein) The elevator safety brake of claim 17, wherein the friction pad has a relatively constant average coefficient of friction for multiple slides having similar conditions along the same guide rail.

19. (Not amended herein) The elevator safety brake of claim 18, wherein the friction pad contains carbon.

20. (Not amended herein) The elevator safety brake of claim 19, wherein the friction pad is fastened to the safety brake wedge with mechanical fasteners and wherein the shoulder is a rectangularly shaped tab having one surface that abuts the friction pad to carry part of a shear load encountered during a braking application when the friction pad engages an elevator rail.

REMARKS

I. Specification

A. Objections

The Examiner has objected to the specification because of an alleged improper use of a trademark. Specifically, the Examiner alleges that the term "carbon metallic" should be capitalized wherever it appears. Applicant has amended the specification and claims to substitute the expression "carbon metallic" with the expression "carbon/metallic composite". Support for the amendment is provided by the specification as a whole, and specifically on page 3, lines 2-5, of the specification as originally filed, where is disclosed that in an embodiment of the invention,

the brake pad is manufactured from Performance Friction Compound 95®, a carbon/metallic composite material.

Applicant has also amended the specification to incorporate the subject matter of claim 7, which recites that the burnished finish of the elevator safety brake pad is a street car brake pad burnished finish. As claim 7 was present in the application as originally filed, incorporation of the subject matter of the claim into the specification cannot constitute addition of new matter into the application.

B. Substitute specification

In order to reduce the chances for erroneous entry of the amendments to the specification, in accordance with 37 C.F.R. § 1.125(b), Applicant provides herewith a substitute specification for entry into the application file. Applicant is also providing a markup version showing the changes made compared to the application as originally filed. For the record, the only amendments to the specification are: replacement of the expression “carbon metallic” with “carbon/metallic composite”; incorporation of the subject matter of claim 7; and addition of paragraph numbers which parallel those in the published application, US 2002/0170790 A1.

In accordance with 37 C.F.R. § 1.125(b)(1), Applicant’s Agent provides the following statement that no new matter has been added:

Statement

The undersigned Agent states under 37 C.F.R. § 1.125(b)(1) that the substitute specification submitted herewith includes no new matter.

Accordingly, entry of the substitute specification and withdrawal of the objection to the specification as originally filed is requested.

II. Claim amendments. Claim Rejections under 35 U.S.C. § 112.

Claim 10 has been amended to incorporate the embodiment of claim 11, now canceled.

Claim 16 has been amended to recite that the friction pad of the elevator safety brake is a carbon/metallic composite friction pad. Support for the amendments to claims 10 and 16 is provided by the original specification at page 3, lines 3-5, and Example 1, pages 6-7. Claim 12 has been amended to remove the dependency upon canceled claim 11. As claim 11 is no longer pending, the rejection of claim 11 under §103 and §112 is moot and should be withdrawn.

Claims 1-9 and 11-15 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. The Examiner alleges that claims 1, 3-4, 6, and 11 recite the trademark “carbon metallic”. Applicant has amended claims 1, 3-4, and 6 to substitute the expression “carbon/metallic composite” for “carbon metallic”. As discussed in Section I above, support for this amendments to these claims is provided by the specification as a whole and by page 3, lines 2-5, of the specification as originally filed. Accordingly, the claims do not recite alleged trademarks and therefore withdrawal of the rejection is requested.

The Examiner alleges that claim 7, which recites the phrase “the burnished finish is a street car brake pad burnished finish”, is unclear and fails to have support in the specification. Applicant has amended the specification at paragraph [0018] to incorporate the subject matter of claim 7, and thereby provide support for the limitation.

For the record, Applicant submits that the meaning of claim 7 is clear to one of ordinary skill in the art. The person of ordinary skill would immediately understand that claim 7 is directed to an embodiment of the invention wherein the burnished finish on Applicant' elevator brake pad is the same as that on a street car brake pad. The ordinary practitioner would also immediately comprehend that the burnished finish would be created on the elevator brake pad using the same procedure that used on the street car brake pad. Accordingly, claim 7 is definite, clearly understood by those in the art, and supported by the specification. Withdrawal of the rejection of claim 7 under §112 is requested.

The Examiner alleges that claim 14 is unclear. Applicant has corrected a minor typographical error in the claim, and therefore withdrawal of the rejection is requested.

III. The claimed invention

The claimed invention is directed to a new type of elevator safety brake pad and elevator safety brake pad assembly. The elevator brake pad is manufactured from a carbon/metallic composite material, and has a consistent coefficient of friction between an initial slide and subsequent slides. The brake pad may be mounted on a backing plate to form the brake pad assembly. Advantageously, the brake pad and assembly do not cause deterioration of the guide rails against which the pads engage during braking. The claimed invention is particularly suitable for use in high-speed elevators and elevators in very tall buildings.

IV. Rejection of claim 10 under 35 U.S.C. §102(b)

Claim 10 is rejected as allegedly anticipated by US 5,979,615 to Thompson et al. (“Thompson”). Anticipation requires that each and every feature of the claimed invention be disclosed in a single prior art reference.

Applicant has amended claim 10 to incorporate the embodiment of claim 11, now canceled, which was not rejected for a lack of novelty. Consequently, the invention of claim 10 is novel for the same reason that the invention of claim 11 was acknowledged to be novel.

Nevertheless, Applicant will briefly distinguish the claimed invention over Thompson. Thompson discloses an elevator safety brake for stopping an elevator car. The safety brake is provided with a brake shoe having a *carbon-carbon composite* friction surface for providing a stopping force. (Abstract)

In contrast, Applicant’s invention is directed to an elevator safety brake pad and assembly manufactured from a *carbon/metallic composite material* (See paragraph [0009]). The pad provide a consistent coefficient of friction which does not deteriorate during use. (Abstract) This feature of the claimed invention, wherein the brake pad is formed from a *carbon/metallic composite*, is not disclosed either explicitly or inherently by Thompson. Accordingly, the claimed invention is not anticipated by Thompson. Withdrawal of the rejection under §102(b) is respectfully requested.

V. Rejection of claims under 35 U.S.C. §103(a)- Thompson

Claims 1-2, 11-13, and 16-20 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Thompson. The Examiner alleges that Thompson discloses each feature of the inventions of the instant claims except for the specific friction material. The Examiner continues

that Thompson allegedly discloses the use of carbon-based materials and the desirability of friction materials with high friction coefficients in elevator brake applications. The Examiner concludes that it would have been obvious to select a carbon metallic material as part of routine material selection to provide an elevator brake.

A. Thompson does not provide any motivation to select a carbon/metalllic composite braking material

Applicant replies that Thompson does not provide any motivation to select a carbon/metalllic composite material. Furthermore, there is at least a strong suggestion that an elevator brake having a metallic component will be unsatisfactory.

As discussed in Section IV above, Thompson is directed to providing an elevator safety brake for high load, high-speed elevators installed in very tall buildings (Abstract). Thompson's invention attempts to overcome drawbacks associated with prior art cast iron brakes, which are disclosed to be unsuitable for high-speed applications. Thompson discloses that:

"[i]n the prior art, the brake pad 32 used in the brake system 10 to provide a friction surface has been formed from gray cast iron. *Gray cast iron, while suitable for low speed, low load conditions, cannot operate as a consistent friction material at high speed and load conditions.* In view of the shortcomings of gray cast iron in such applications, it has been found that the gray cast iron material used as the high friction material in pads 32 may be replaced with a carbon-carbon composite material." (Col. 3, lines 9-17, emphasis added)

Thompson teaches that cast iron has inadequacies which render this material useless in high-speed applications. Therefore, there is at least a strong suggestion that metallic brakes would be inappropriate for high-speed elevators. Applicant's submit that the cited disclosure by Thompson is tantamount to a teaching against the use of metallic components for elevator brakes in favor of a carbon-carbon composite braking material.

In contrast, Applicant's invention is directed to elevator brakes manufactured from a carbon/metallic composite. Elevator safety brake pads prepared in accordance with Applicant's invention explicitly contain a metallic material. Therefore, in view of the teachings of Thompson, there is at least a strong suggestion that Applicant's invention would provide suboptimum results. In view of Thompson's disclosure, one of ordinary skill in the art would be dissuaded by Thompson from using brake pads containing metallic materials, and would have searched for braking materials manufactured from carbonaceous, non-metallic materials.

Accordingly, Thompson teaches away from Applicant's invention. The claimed invention is not an obvious extension of Thompson's disclosure, and the rejection of claims 1-2, 12-13, and 16-20 under §103(a) should be withdrawn.

B. The rejection under §103 is based on an impermissible “obvious to try” standard

Applicant submits that the obviousness rejection of claims 1-2, 12-13, and 16-20 is improperly based on an “obvious to try” standard, i.e., “it would have been obvious ...to select a carbon metallic material as part of routine material selection to provide consistent braking”. However, “obvious to try” is not a proper basis for a §103 rejection when there is no suggestion in the prior art that would have led the skilled artisan to use a carbon/metallic composite in an elevator safety brake. There is no suggestion in the cited art that a carbon/metallic composite would bring about an improved elevator safety brake.

Not only does Thompson fail to disclose carbon/metallic composites, there is no appreciation by Thompson that a carbon/metallic composite would provide advantageous braking properties in high-speed elevator applications. In fact, Thompson teaches that metallic

elevator brakes are unsuitable for high-speed and high-load elevators. Through their own investigations, Applicant has surprisingly found that elevator brakes formed from carbon/metallic composite materials yield favorable braking properties. This direction of Applicant's investigations is clearly not suggested or directed by Thompson. It is only with hindsight, which is also improper, that the Examiner can allege that the claimed invention is obvious in view of the cited prior art.

Accordingly, in view of the teaching of the prior art that metallic brakes are unsuitable for high-speed elevator applications, it would not have been obvious to do (not obvious to try) what Applicant has done. Thus, the direction of Applicant's investigation leading to the claimed invention is clearly not motivated by Thompson. Consequently, withdrawal of the rejection under §103 in view of Thompson is requested.

VI. Rejection of claims under 35 U.S.C. §103(a)- Thompson in view of Chwastiak

Claims 3-9 and 14-15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Thompson, as applied to claim 11, in view of US 5,693,402 to Chwastiak et al. ("Chwastiak"). The Examiner alleges that Thompson discloses all the limitation of the instant claims except for the feature of laser burnishing the brake pad. The Examiner relies upon Chwiastek for an alleged disclosure of a method of laser burnishing a brake pad, and concludes that it would have been obvious to combine Thompson and Chwiastek to obtain a more stable friction coefficient.

Thompson and Chwiastek are not properly combinable

Applicant replies that Thompson and Chwiastek are not properly combinable. As already discussed, Thompson teaches against the use of metallic brake pads for use in high-speed elevators.

Chwiastek discloses a method of burnishing a brake pad using a high intensity heat source such as a laser. Chwiastek discloses that “[p]referably, the brake pad is a *metallic* brake pad containing resinous binder and other carbon ingredients capable of being oxidized or carbonized” (col. 2, lines 32-34”). Therefore, there is at least a strong suggestion that the most favorable substrate for the burnishing process is a *metallic* brake pad having a certain amount of carbon ingredients. Consequently there is a strong implication that brake pads made from other materials, that is, non-metallic brake pads, would not be suitable for the burnishing process.

Accordingly, the teachings of Thompson and Chwiastek are incompatible. Thompson advocates the use of carbon-carbon composite brake pads and teaches against metallic brake pads, whereas Chwiastek advocates the burnishing process for metallic brake pads. One of ordinary skill in the art would therefore not be motivated to burnish metal-containing brake pads (as taught against by Thompson) in the manner of Chwiastek. Therefore, a *prima facie* case of obviousness has not been established, and withdrawal of the rejection of claims 3-9 and 14-15 under §103(a) is requested.

Furthermore, Thompson and Chwiastek are directed to different fields. Thompson is directed to the field of elevator brakes, and Chwiastek is directed to automobile braking (See, for example, col. 1, lines 21-25; col. 2, lines 59-61; and the Examples). The ordinary practitioner

would not have any reason to expect that a disclosure about automobile brake pads could be successfully applied to elevator brake pads. As automobile brake pads are manufactured to different specifications and are used in dissimilar environments compared to elevator brake pads, one of ordinary skill would not be motivated to search the field of automobiles for answers to problems with elevators.

CONCLUSION

Applicant submits that the claimed invention has been distinguished over the cited prior art. Upon entry of this Amendment, claims 1-10 and 12-20 are pending. Applicant submits that claims 1-10 and 12-20 are in condition for allowance, which action is earnestly solicited.

Authorization is hereby given to charge any fee which may be due in connection with this communication to Deposit Account No. 23-1703.

Dated: May 5, 2003

Respectfully submitted,

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Amended claims- Version with markings to show changes made

1. (Amended) An elevator safety brake pad assembly comprising:

a carbon/metallic composite [metallic] elevator safety brake pad, the carbon/metallic composite [metallic] elevator safety brake pad comprising:
a mounting surface for engaging a backing plate;
a sliding surface for engaging an elevator guide rail, the sliding surface having a burnished finish and having a relatively constant coefficient of friction when engaging and sliding along the elevator guide rail during an initial slide, and wherein the average coefficient of friction for subsequent slides, under conditions of similar load and speed, remains relatively constant; and

an elevator safety brake backing plate having a wedge-mounting surface for engaging and mounting an elevator safety wedge and a pad-mounting surface on which the carbon/metallic composite [metallic] elevator safety brake pad is mounted.

3. (Amended) An elevator safety braking system comprising:

an elevator brake wedge comprising:
a top surface;
a bottom surface, the bottom surface generally parallel with the top surface and located below the top surface;
an inclined surface intersecting the top surface at an obtuse angle and intersecting the bottom surface at an acute angle [angel];
a rail-facing surface intersecting the top and bottom surfaces at approximately a right angle; and
a tab extending normally away from the rail-facing surface for absorbing shear loads from an elevator brake pad;
a brake pad backing plate, the brake pad backing plate having a pad-mounting surface for mounting a brake pad and a wedge-mounting surface for engaging the rail-facing surface of the elevator brake wedge, the brake pad backing plate mounted along the rail-facing surface of the elevator brake wedge below the tab;

a carbon/metallic composite [metallic] brake pad for engaging a steel elevator guide rail comprising:

a mounting backing surface for engaging the backing plate, and

a sliding surface for engaging an elevator guide rail, the sliding surface having a burnished finish, the sliding surface also having an approximately constant coefficient of friction when sliding against the rail during an initial slide,

wherein the coefficient of friction for subsequent slides between subsequent braking applications remains relatively constant.

4. (Amended) An elevator safety brake pad assembly comprising:

an elevator brake wedge, the elevator brake wedge having a rail-facing surface;

a brake pad backing plate, the brake pad backing plate having a pad-mounting surface for mounting an elevator safety brake pad and a wedge-mounting surface that engages the elevator brake wedge along the rail-facing surface;

a carbon/metallic composite [metallic] brake pad for engaging an elevator guide rail, the carbon/metallic composite [metallic] brake pad being mounted to the backing plate and comprising a sliding surface for engaging an elevator guide rail, the sliding surface having a burnished finish.

6. (Amended) A carbon/metallic composite [metallic] elevator safety brake pad for engaging an elevator guide rail comprising:

a mounting surface for engaging a backing plate; and

a sliding surface for engaging the elevator guide rail, the sliding surface having a shape complementary to the elevator guide rail, the sliding surface also having a burnished finish, the sliding surface further having an approximately constant coefficient of friction when sliding against the elevator guide rail during an initial slide,

wherein the coefficient of friction for subsequent slides remains relatively constant, under conditions of similar speed and loads.

7. (Amended) The carbon/metallic composite [metallic] elevator safety brake pad of claim 6, wherein the burnished finish is a street car brake pad burnished finish.

9. (Amended) The elevator safety brake pad of claim 6, wherein the coefficient of friction (μ) between the rail and the carbon/metallic composite [metallic] elevator safety brake pad is approximately defined approximately by the following equation:

$$\mu = 1.258 * v^{-0.2687}$$

for an elevator having a load of approximately 15,000 lbs,

wherein v = the velocity of the brake pad assembly when it first engages the elevator guide rail.

10. (Amended) An elevator braking apparatus comprising:

a pad mounting structure having a rail-facing surface for facing an elevator rail;

a shoulder protruding from the rail-facing surface;

and a friction pad manufactured from a carbon/metallic composite friction material and mounted to the rail-facing surface and abutting a portion of the shoulder.

12. (Amended) The elevator braking apparatus of claim 10 [11], wherein, when the friction pad engages an elevator rail during a single slide, the coefficient of friction between the rail and the pad remains relatively constant.

14. (Amended) The elevator braking apparatus of claim 10 [11], wherein the friction pad has a [at a] surface having a burnished finish.

16. (Amended) An elevator safety brake comprising:

an elevator safety brake wedge, the wedge having a pad mounting surface and a shoulder protruding from the pad mounting surface;

a carbon/metallic composite friction pad, the friction pad mounted to the pad mounting surface and abutting the shoulder, wherein the friction pad has an average coefficient of friction defined approximately by the following equation:

$$\mu = 1.258 * v^{-0.2687}$$

wherein v = the velocity of the brake pad assembly when it first engages an elevator guide rail.